
Review of Methodology for Gas and Diesel Excise Tax Rate Adjustments Under the “Fuel Tax Swap”

February 2014

Prepared for the
Board of Equalization

Prepared by
Capitol Matrix Consulting



February 14, 2014

Cynthia Bridges
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Dear Ms. Bridges,

We are pleased to present our review of the Board of Equalization (BoE) staff methodology for calculating gasoline and diesel excise tax rates under the provisions of the fuel tax swap. As indicated in the accompanying report, we conclude that the BoE staff's methodology and calculations are reasonable, though the BoE may benefit from making its fuel price and gallonage projections independent of the Department of Finance. We also point out that changes in excise tax rates from year to year are inevitable, given the requirements for revenue neutrality in the law and the inherent volatility in fuel prices.

Sincerely,

Brad Williams
Senior Partner

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Executive Summary

Under the provisions of the “fuel tax swap” legislation enacted in 2010 (AB X8 6, Chapter 11/2010), the Board of Equalization (BoE) is required to annually calculate the motor vehicle fuel excise tax rates on gasoline and diesel needed to offset the changes in the state sales tax rates required by Chapter 11/2010 in order to maintain revenue neutrality. Specifically, the BoE is required to annually calculate (1) the increase in the gasoline excise tax rate needed to offset the elimination of the state 5 percent sales tax on gasoline, and (2) the decrease in the diesel excise tax needed to offset the 1.75 percent sales tax rate increase (beginning in 2014) on diesel fuel. This report presents our review of the BoE’s staff calculations. Our key findings are:

- The data sources and methodology used by BoE are reasonable and consistent with the requirements of Chapter 11/2010.
- Regarding projections of fuel prices and gallonage – two key determinants of the excise tax rates under the fuel tax swap – the BoE uses as a starting point the Department of Finance’s (DoF’s) budget forecast, and then makes incremental adjustments for material changes to the outlook that occur after the DoF prepares its forecast. We believe this is a defensible approach, given the DoF’s forecasting expertise. However, the BoE may wish to consider making its projections independent of the DoF’s forecast, provided that adequate resources are available.
- Regardless of the exact forecasting methodology used, year-to-year variations in the excise tax rates are an inevitable consequence of the volatility in gasoline and diesel prices. Changes in these measures will have impacts on excise tax rates either when BoE sets the rates based on projections for the upcoming year or two years later, when actual data for the year in question becomes available and a “true up” adjustment required by Chapter 11/2010 is made.

Introduction

In 2010 the Legislature and the Governor enacted AB X8-6 (Chapter 11/2010), which changed the way that the state taxes transportation fuels, and how it provides funding for transportation. The measure provided that the state portion of the sales tax would no longer apply to sales of gasoline, but the gasoline excise tax would be raised sufficiently to recover the lost sales taxes. For diesel fuels, the opposite occurred – the General Fund sales tax was increased and the excise tax on diesel fuels was lowered by an amount sufficient to offset the increase.

The purpose of these changes was to provide the state with greater flexibility in the expenditure of these funding sources. In effect, the legislation provided General Fund savings, as it allowed the state's cost for debt service on transportation bonds to be paid from transportation tax revenues instead of the General Fund. It also reduced the amount of transportation tax revenues that were to be allocated for local transit operations¹.

In both cases, the law requires the Board of Equalization (BoE) to annually adjust excise tax rates to ensure that the combined revenues from the sales and excise taxes are "revenue-neutral" relative to what would have been collected under the prior law. In order to maintain revenue neutrality, it is necessary to make annual adjustments to the excise tax rate. This is because annual changes in gas or diesel prices that occur from year to year directly impact the sales tax (which is levied on revenues from fuel sales), but do not directly impact the excise tax (which is levied on a per-gallon basis and is invariant to price).

This report presents our findings regarding the BoE's methodology, and discusses the reasons for past excise tax rate changes as well as the likelihood for future changes under the fuel tax swap legislation.

Background

In California, both retail sales taxes and excise taxes generally apply to transportation fuels.² The Board of Equalization administers both the excise tax and the sales tax, and maintains data on

¹ Following passage of Proposition 26 in November 2010, the fuel tax swap was reenacted by a 2/3 vote to comply with the initiative's retroactive approval requirements (AB 105, Chapter 6, 2011). That legislation also modified the sales tax rate increases on diesel from 2011-12 through 2013-14 and changed the source of funding for the payment of debt service on transportation bonds.

² There are modest differences between the application of the sales tax and excise tax to fuel under California law. Specifically, fuels used off-highway for farm, off-road (including railroads and construction equipment) and marine purposes are exempt from the excise tax but are generally subject to the sales tax (though fuel used for farm equipment is exempt from the state sales tax). These excise-tax exemptions reflect the historical fact that the excise tax on transportation fuels was intended to be similar to a user fee, where highway users pay for the cost of building and maintaining highways. The broader application of the sales tax has little practical effect on the number of gallons reported for gasoline, since the great majority of off-road fuel usage relates to diesel. However, the broader applicability does have a significant impact on the diesel side, where a substantial number of gallons are used for trains and off-road uses. For this reason, diesel fuel used for off road and other activities previously exempted from the excise tax was also exempted from the sales tax increase under the fuel tax swap through companion legislation (SB 70, Chapter 9/2010).

gallons of fuel sold, average fuel prices, and revenues collected. These data were previously needed to calculate the amount of required transfers of sales tax revenues to the Public Transportation Account, a transfer greatly reduced by the fuel tax swap.

Chapter 11/2010 set the additional excise tax rate at 17.3 cents per gallon to offset the elimination of the state sales tax in 2010-11. This resulted in a total excise tax rate of 35.3 cents per gallon. To offset the initial 1.87 percent increase in the sales tax on diesel fuel, Chapter 11/2010 reduced the excise tax rate by 5 cents per gallon in 2011-12 (leaving a remaining excise tax rate of 13 cents). The additional sales tax rate has varied from year to year, and is scheduled to be 1.75 percent on July 1, 2014 and thereafter.

The BoE is required to make annual tax rate adjustments to compensate for changes in the price and volume of fuel sold, and – beginning in 2012-13 – a “true-up” required by Chapter 11/2010 for any over/under collection of fuel tax swap revenues in the preceding years. As indicated in Figure 1, the incremental excise tax rate on gasoline has increased from the initial 17.3 cents in 2010-11 to 21.5 cents in 2013-14 (a total rate of 39.5 cents per gallon), generally reflecting higher fuel prices. The BoE staff projects a rate reduction to 18.0 cents in 2014-15.

Figure 1
BoE Gasoline Tax Swap Calculations
2010-11 Through 2014-15

	2010-11	2011-12	2012-13	2013-14 (Estimated)	2014-15 (Projected)
<i>Sales tax eliminated:\a</i>					
Price per gallon excluding tax\b	\$2.83	\$3.51	\$3.70	\$3.56	\$3.37
Gallons sold (millions)	14,700	14,417	14,337	14,247	14,151
Sales tax rate	6.0%	5.5%	5.0%	5.0%	5.0%
Total revenues eliminated	\$2,499	\$2,783	\$2,652	\$2,539	\$2,388
<i>New excise tax on gasoline:</i>					
Gallons sold (millions)	14,766	14,597	14,489	14,392	14,295
New excise tax rate	\$0.173	\$0.177	\$0.180	\$0.215	\$0.180
Total Revenue Increase	\$2,555	\$2,584	\$2,608	\$3,094	\$2,576
<i>Revenue differences:</i>					
Annual (millions)	\$56	-\$88	-\$44	\$555	\$188
Cumulative (millions)	\$56	-\$144	-\$188	\$367	\$555

a\Prices and gallons for sales tax lagged six months due to time needed for identification and reporting.

b\Equals price per gallon before local sales tax and new excise tax are applied.

As shown in Figure 2, the incremental reduction to the excise tax on diesel fuel expanded from 5 cents in 2011-12 to 8 cents in 2012-13 and 2013-14 – again reflecting higher fuel prices – but is projected to decline to 7 cents in 2014-15.

Figure 2
BoE Diesel Tax Swap Calculations
2011-12 Through 2014-15

	2011-12	2012-13	2013-14 (Estimated)	2014-15 (Projected)
<i>Sales tax increase:\a</i>				
Price per gallon excluding tax	\$3.68	\$3.69	\$3.48	\$3.56
Gallons sold (millions)	2,398	2,412	2,461	2,511
Rate increase	1.87%	2.17%	1.94%	1.75%
Total increase	\$165	\$193	\$166	\$156
<i>Excise tax reduction:</i>				
Gallons sold (millions)	2,587	2,587	2,640	2,693
Rate reduction	-\$0.05	-\$0.08	-\$0.08	-\$0.07
Total revenue reduction	\$129	\$207	\$211	\$178
<i>Revenue difference:</i>				
Annual (millions)	-\$36	\$14	\$45	\$21
Cumulative (millions)	-\$36	-\$21	\$24	\$45

a\Equals price per gallon before local sales tax and new excise tax are applied.

Board of Equalization Methodology

To calculate the tax swap for gasoline and diesel, the Board relies on data it collects on the actual gallons of gasoline and diesel sold in the state, the average price per gallon at which those fuels are sold, and projections of those gallons and prices for the period between the last actual data and through the end of the upcoming fiscal year. There is a lag of about 7 quarters between the last actual data and the conclusion of the upcoming fiscal year – thus, BoE must estimate or forecast price and gallons for 1¾ years.

BoE staff's general approach is to use the Department of Finance (DoF) annual budget forecast for gallons and prices as a starting point, and then make incremental adjustments to the DoF price forecast to reflect material changes to the outlook that occur between when DoF makes its budget forecast (early December) and when the BoE staff presents its calculation to the Board in February. Its incremental changes are based on receipt of actual data, as well as revisions to national gasoline

price forecasts made by IHS Global Insight (a well known national economic forecasting and consulting firm) that occur during the time frame. Reflecting these factors, the BoE made a modest upward adjustment to the DoF gasoline price forecast last year, and is making a modest downward adjustment to the DoF price forecast this year.

These projections are used first to determine:

- The amount of sales tax that would have been generated from gasoline sales had the state sales tax continued to apply, based on the estimated gallons and price; and
- The amount of sales tax that is generated from diesel sales and attributable to the increased sales tax rate of 1.75 percent (as of 7/1/14), again based on the estimated gallons and price.

These dollar amounts are then used to calculate the incremental excise tax rates that are needed to offset the sales tax changes and ensure the overall revenue neutrality for the upcoming fiscal year. Because these excise tax rates are based upon projections of gallons and prices, the law provides for a “true-up,” or reconciliation once actual price and gallonage data becomes available for the relevant fiscal year. For the current calculation, the true-up adjustment is based on actual data for the 2012-13 fiscal year, and the adjustment needed to offset any overage or shortfall in 2012-13 is included in the rates set for 2014-15.

2014-15 Calculations. Figure 3 shows the steps in the calculation of the gasoline excise tax rate for 2014-15. It shows that the BoE staff assumes that prices will average \$3.37 per gallon (before local sales taxes and the new excise tax are applied), that 14.2 billion gallons of gasoline will be consumed in the state, and the application of the former 5 percent sales tax rate would have raised \$2.4 billion. Taking into account the 14.3 billion in gallons subject to the excise tax, a 16.7 cents per gallon excise tax rate is needed to offset the foregone sales tax revenues.

In addition, based on differences between estimated and actual prices and gallons through 2012-13, actual collections from the excise tax through that year were \$188 million less than what would be needed to achieve revenue neutrality through that year, thereby creating a true-up obligation of a like amount. Spreading the \$188 million over the projected gallons consumed (14.3 billion) would require an additional 1.3 cents per gallon, raising the new excise tax to 18.0 cents per gallon. Combined with the previous 18-cent excise tax, total gasoline excise taxes will be 36.0 cents per gallon. This represents a 3.5 cent reduction from the current 2013-14 rate.

Figure 3
BoE Fuel Tax Swap Calculation for 2014-15: Gasoline

Estimated Variable	2014-15
<i>Sales tax eliminated:\a</i>	
Price per gallon excluding tax\b	\$3.37
Sales tax gallons (millions)	14,151
Eliminated sales tax rate	5.0%
Total (\$ millions)	\$2,388
<i>New gas excise tax:</i>	
Excise tax gallons (millions)	14,295
Rate increase needed to offset sales tax loss relative to prior law in 2014-15	\$0.167
<i>True-up calculation for 2012-13:</i>	
Cumulative surplus (+)/shortfall (-) through 2012-13 (millions)	-\$188
Amount per-gallon (true-up adjustment)	\$0.013
<i>Combined increased excise tax rate in 2014-15</i>	\$0.180
Total (rate increase plus prior 18 cent rate)	\$0.360
Incremental change from prior year	-\$0.035

a\Prices and gallons for sales tax lagged six months due to time needed for identification and reporting.

b\Equals price per gallon before local sales tax and new excise tax are applied.

Figure 4 shows the steps taken by the BoE staff to calculate the diesel tax swap for 2014-15. It shows that the 1.75 percent increase in the sales tax required by Chapter 11/2010 results in an estimated revenue increase of \$156 million. That increase in sales taxes requires a corresponding reduction in excise tax revenues, which when spread over the 2.69 billion gallons projected to be sold in 2014-15, would result in a per gallon reduction of 5.8 cents. In addition, through 2012-13, the cumulative amount of sales taxes raised were \$21.4 million more than the amount of excise taxes eliminated. When spread over the 2.69 million gallons, the \$21.4 million difference results in an additional "true-up" reduction in the excise tax rate of 0.8 cents per gallon, for a combined reduction of 6.6 cents. After this adjustment, the remaining diesel excise tax rate is 11.4 cents, or 11 cents per gallon after rounding.

Figure 4
BoE Fuel Swap Estimate in 2014-15: Diesel

Estimated Variable	2014-15
<i>Sales tax increase:</i>	
Price per gallon excluding tax:\a	\$3.56
Sales tax gallons (millions)	2,510
Statutory increase in sales tax rate	1.75%
Total increase	156
<i>Excise tax reduction:</i>	
Excise tax gallons (millions)	2,693
Rate reduction needed to offset sales tax increase in 2014-15	-\$0.058
<i>True-up calculation for 2012-13:</i>	
Cumulative difference: sales taxes raised versus excise taxes eliminated	\$21.4
Amount per-gallon (true-up adjustment)	-\$0.008
<i>Total excise tax rate reduction:</i>	-\$0.066
Remaining excise tax rate (after rounding)	\$0.110

a\Equals price per gallon before local sales tax and new excise tax are applied.

CMC Review

In conducting our review, we met with staff of the BoE and the DoF and reviewed their procedures for collecting and sharing the data needed for completing the tax swap calculations. We examined the statutory differences in the application of the sales tax and excise tax to gasoline and diesel fuel, and the procedures for the payment of refunds on tax-exempt fuel. We reviewed data from the State Controller's summary of motor vehicle fuel tax refunds. We also looked at prior law requiring transfers of gasoline sales tax revenues to state transportation funds. Finally, we evaluated the sensitivity of the tax swap calculations to alternative price forecasts.

Our review focuses on three key aspects of BoE staff's calculation: (1) the underlying data used in the calculations, (2) the swap calculations themselves; and (3) the projections on which the calculation depends. Given the greater applicability and larger changes in excise tax rates on gasoline, most of our discussion will focus on the swap as it relates to gasoline taxes. However, findings are generally applicable to the diesel-related swap estimates.

Findings Regarding Data

Our review found that the BoE uses appropriate data sources. The gasoline price data is based on a widely used and accepted survey of California prices by grade of gasoline taken by the U.S. Energy Information Administration (EIA) each week. The gallons data used in the calculations come from monthly motor vehicle fuel tax distribution reports compiled by the BoE. We found no anomalies or inconsistencies in the use of this data.

We note that there are modest differences in the gallons of diesel subject to the sales versus excise tax. A key factor behind the difference is that, under the International Fuel Tax Agreement, gallons of diesel fuel sold to interstate truckers outside of California but used in the state are subject to California's excise tax, and its gallons are included in the excise tax totals. These gallons are not, however, included in the retail totals subject to the sales tax.

There are also modest differences due to the timing of the data used in the gasoline tax calculations. Specifically, the gallons (and corresponding price data) used for the sales tax calculations are lagged about one-half year relative to the gallons used for the excise tax changes. As an example, the excise tax calculations for 2013-14 are based on gallons sold during the fiscal year, whereas the sales tax collections are based on gallons sold during the 2013 calendar year. This one-half year lag is related to the timing used for the sales tax transfers made under prior law, and reflects the greater time that it takes for the BoE to receive payments and identify fuel-related sales tax transactions. Given these administrative realities, using lagged data on the sales tax side is reasonable. Any minor distortions caused by the time lag are temporary and likely to be fully offset in subsequent years. However, we recommend that the BoE evaluate the administrative feasibility of eliminating this lag in future calculations.

Findings Regarding Methodology and Calculations

The methodology for calculating the fuel tax swap is straightforward once the input data and projections are developed. We replicated the BoE calculations and found no problems or inconsistencies in the calculations for the individual years.

Findings Regarding Projections Used In Swap Calculation

As noted below, key factors affecting the excise tax rate calculations are projections of gallons and fuel prices. While the projections made in previous years appear to be reasonable in light of the circumstances that were present at the time of the estimates, significant differences existed between estimated and actual amounts. This is particularly true with respect to fuel prices, where, for example, the current estimate of the average per gallon gasoline price is about \$0.40 below the projection made one year ago. These differences resulted in subsequent true-up payments of +1.1 cents for 2011-12 and +1.3 cents for 2012-13. Based on current trends, the true up payment for the current year could be a negative 4 cents (which will occur in 2015-16).³

Current BoE staff methodology. As noted previously, the BoE staff currently relies primarily on the DoF to prepare the gallons and fuel price projections needed for the calculations, making only

³ This does not mean the actual rate in 2015-16 will be 4 cents lower than in 2014-15. The 2015-16 rate will depend on both the true-up adjustment for 2013-14 and the projected level of gasoline prices and gallons in 2015-16.

incremental adjustments to the DoF forecast based on significant developments that occur after its budget forecast is prepared in early December. This is a defensible methodology on the grounds that DoF has the expertise and experience needed to prepare gasoline price and consumption forecasts.

Independent approach would have benefits. While BoE's incremental approach is defensible, its staff could benefit from developing its forecast independently, based on their analysis of how such factors as crude prices, refinery capacity, changing supply and demand, and regulatory requirements will affect fuel prices. We believe that a focused independent analysis each year holds the potential to improve the BoE's forecasts over time.

However, excise tax rate changes will continue to occur. Forecasting improvements will make it more likely that offsetting changes in excise tax rates will occur on a timely basis, so that taxpayers experience neutrality within the same fiscal year. However, better forecasts will not eliminate the need for year-to-year changes in the excise tax rates themselves. This is because fuel prices are volatile, and changes in fuel prices have a direct impact on the level of excise taxes needed to maintain revenue neutrality under the fuel tax swap.

As an indication of the volatility, Figure 5 shows that the average annual percent change in gasoline prices has been 8 percent during the past decade, and the average variation around that trend has been an even greater 13 percent. In contrast, the average annual change in the number of gallons sold has been -0.8 percent, with a standard deviation of 1.8 percent⁴.

Examples of impacts of fuel price changes on excise tax rates. Changes in prices directly impact the amount of sales taxes collected, since sales taxes are affected by both the number of gallons sold and the price of fuel. However, price changes will not have offsetting impacts on excise taxes, which depend only on gallons sold. Thus, the excise tax rates need to be adjusted to maintain revenue neutrality. To provide a general indication of the effect of price changes, consider that at current price levels each 10 percent increase in the price of gasoline will increase the excise tax rate required for neutrality by about 1.7 cents. As another example, a one-dollar increase in the price of gasoline will increase the excise tax needed to maintain neutrality by 5 cents in a single year.

Figure 5
Variability in Annual Percent Change in Gasoline Gallons and Prices
2003 to 2013

	Gallons Sold	Average Annual Price
Average	-0.8%	8.5%
Standard Deviation	1.8%	13.3%

The inherent price volatility has two important implications for the fuel tax swap calculations:

⁴ Even in the unlikely event that gallons change significantly in a particular year, there will not be a large effect on the required excise tax rates. This is because the changes affect both sides of the swap calculation in the same way. For example, an unanticipated increase in gasoline gallons would raise both the amount of sales taxes foregone and the amount of new excise taxes received in a given year, leaving the bottom line difference relatively unchanged.

- First, given the sensitivity of fuel tax swap calculations to gasoline and diesel price levels, year-to-year changes in the excise tax rate are an inevitable consequence of the volatility in fuel prices. Similarly, over a long period of time, if fuel prices rise in line with general price levels, gasoline excise tax rates will necessarily rise to maintain neutrality under the law⁵.
- Second, regardless of how accurate or inaccurate the price projections are, the true-up provisions of the fuel tax swap ensure that the required change in the excise tax rates for a particular year will eventually take place, once actual data for a that fiscal year is known.

Stated another way, given the volatility in fuel prices and the true-up provisions in existing law, the question is not whether excise taxes will change, but rather how and when these changes will occur.

Conclusion

The BoE staff's use of data and its approach to calculating the fuel tax swap are reasonable and consistent with current law. Regarding the price and gallons projections that are necessary to set the excise tax rate for the following year, BoE staff relies on the DoF annual budget projection as a starting point, and then makes incremental adjustments for subsequent changes in the outlook. This approach is defensible, given the forecasting expertise that resides within DoF, though we believe that BoE could benefit from making its forecasts independently.

We further find that annual variation in the excise tax rate is an inevitable consequence of the inherent volatility in gasoline and diesel prices. Ideally, these variations will be anticipated in the BoE's year-ahead projections, so that the changes in the excise tax rates are contemporaneous with changes in the fuel prices. However, even if they are not correctly anticipated, revenue neutrality will occur over the longer term, due to the true-up provisions in the fuel tax swap.

⁵ The opposite is true for the excise tax adjustment for diesel, where the excise tax is reduced to offset the 1.75 percent increase in the sales tax. In this case, a long-term rise in diesel fuel prices would result in a corresponding increase in the amount of per-gallon sales tax collections, which in turn will require a larger offsetting reduction in the excise tax rate.